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भारतीय मानक

गैस आधारित इंस्टेन्टेनियस वॉटर हीटर के संस्थापन — रीति संहिता

Indian Standard

INSTALLATION OF GAS BASED INSTANTANEOUS WATER HEATER — CODE OF PRACTICE

ICS 91.140.65; 97.100.20

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Domestic and Commercial Gas Burning Appliances (Pressure Type) Sectional Committee, MED 23

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Domestic and Commercial Gas Burning Appliances (Pressure Type) Sectional Committee had been approved by the Mechanical Engineering Division Council.

Proper installation is very important for safe uses of water heater. Improper installation may result in asphyxia, fire or explosion causing personal injury or damage to property. Therefore, it was decided to formulate this standard for the benefit of all stakeholders.

Those responsible for installation should understand the characteristics of gas employed and should be trained in good practices of handling, installing and maintaining instantaneous gas based water heaters.

Statutory requirements regarding installations of gas based water heaters as enforced from time to time shall be complied with.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INSTALLATION OF GAS BASED INSTANTANEOUS WATER HEATER — CODE OF PRACTICE

1 SCOPE

1.1 This standard lays down the requirements for installation of gas based instantaneous water heaters.

1.2 This standard also applies to the associated components like piping and equipment used for installation of the water heater.

1.3 In case instructions given in the standard are not followed exactly, it may result in asphyxia, fire or explosion causing personal injury or damage to the property.

2 REFERENCES

The standards given below contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards:

IS No.	*Title*
1239 (Part 1) : 2004	Steel tubes, tubulars and other wrought steel fittings — Specification: Part 1 Steel tubes (*sixth revision*)
2379 : 1990	Pipelines-identification — Colour code (*first revision*)
2501 : 1995	Solid drawn copper tubes for general engineering purposes — Specification (*third revision*)
3601 : 2006	Steel tubes for mechanical and general engineering purposes — Specification (*second revision*)
9573 : 1998	Rubber hose for liquefied petroleum gas (LPG) — Specification (*second revision*)
9798 : 1995	Low pressure regulators for use with liquefied petroleum gas (LPG) mixtures — Specification (*first revision*)

3 GENERAL REQUIREMENTS

3.1 Cylinders, valves and regulators used with the water heaters shall be as approved by the statutory authority. All other installation materials like pipe, flexible pipes, hoses, etc, shall comply with the relevant Indian Standard specifications, wherever applicable. If no relevant Indian Standard is available; such equipment shall comply with requirements of gas distributing company.

3.2 Gas piping colour shall be in accordance with IS 2379 or as stipulated by the statutory authority to distinguish it from other pipes.

3.3 Before installation water heater shall be inspected visually for any physical damage. Check the marking on the marking plate of the water heater to ascertain, if the type of the gas supply corresponds to the water heater design.

3.4 Installation/safety instructions provided by the water heater manufacturer shall be followed.

3.5 Long hot water lines should be insulated to conserve energy.

3.6 PVC hose pipe should not be used for hot water.

4 WATER HEATER LOCATION AND INSTALLATION

4.1 The water heater shall be installed in a well cross-ventilated room of minimum volume 20 m^3. The room should have an air inlet area of minimum 0.09 m^2. In case of insufficient ventilation or area, gas water heater shall be installed in other open space and hot water pipeline shall be provided in the intended area.

4.2 Installation of water heater inside the bathroom is not recommended, unless condition specified in **4.1** are complied with (*see* **1.3**).

4.3 Water heater shall not be installed in bed rooms and any occupied space normally kept closed.

4.4 Water heater shall not be installed in a small poorly ventilated room or air tight room with air conditioner.

4.5 The water heater shall not be installed near an air supply containing halogenated hydrocarbons.

NOTES

1 The air in beauty shop, dry-cleaning establishments. photo processing labs and storage area for liquid and powder bleach or swimming pool chemicals often contain such halogenated carbons.

2 An air supply containing halogenated carbon may be safe to breathe, but when it passes through a gas flame, corrosive elements are released that will shorten the life of any gas burning appliance.

4.6 Water heater shall not be installed in places where liquids, which give off flammable vapours are used/ stored. Such liquids include gasoline, liquefied petroleum gas, paint or adhesive and their thinners, solvents or removers. The open flame of the water heater's main burner may ignite these vapours causing an explosion of fire which may cause severe burns/ death or damage to property.

4.7 The water heater shall not be installed below the ground level, such as, in basement or in cellar.

4.8 Water heater shall not be installed near vents for heating. In such a case minimum distance of 1.2 m shall be maintained.

4.9 The water heater shall be so located that the gas outlet from cylinder is below the level of gas inlet of the water heater.

4.10 Vent manufacturer instruction should be followed while installing vent. The vent pipe must accommodate the size of the water heater's chimney and should be of flame retardant anti-corrosive material. The vent pipe should be fitted with an H type hood or similar to prevent blow back of burnt gases and the entry of rain into the vent.

4.11 There shall not be any electrical wiring, electrical points or electrical equipments above the water heater. The minimum distance of water heater from electrical wires, points or equipments shall be 0.60 m.

4.12 The water heater shall be firmly mounted on a wall with screws or nut and bolts strong enough to withstand its load. Water heaters shall not be mounted on walls/wall lining made up of wood/plastic or any other combustible/thermoplastic materials.

4.13 The bottom of the water heater shall be at least 1.5 m above the floor level and top of the exhaust point shall be at least 2.1 m above the floor level.

4.14 The water heater shall be installed in such a way that its control knobs are out of reach of children under normal conditions of use.

4.15 No inflammable or corrosive materials shall be kept near the water heater.

4.16 The water and gas connections given into the water heater shall be leak proof.

5 CYLINDER LOCATION

5.1 The cylinder shall be kept outside the bathroom or any other area where,

a) it does not come into contact with water so as to avoid risk of corrosion; and

b) in case of accidental leakage, gas is released to the open atmosphere.

5.2 In case the cylinder is kept in closed area, proper bottom clearance and air ventilation shall be provided.

5.3 No electrical wiring or point or apparatus should be within 0.6 m from the cylinder.

5.4 The cylinder shall have easy access for switching/ changing of the regulator, etc.

6 PRESSURE REGULATORS

6.1 The pressure regulator used with the device shall conform to IS 9798 (for LPG) or as approved by the statutory authority. No click-on adopters shall be used with the cylinders.

6.2 If the regulator is fitted with a relief valve, care should be taken in positioning the regulator so that there is no obstruction in release of gas.

6.3 The regulator shall be properly mounted on the cylinder.

7 PIPING (EXCLUDING MANIFOLDS)

7.1 All gas piping, tubing and fitting shall comply to relevant Indian Standards or with the requirement of the statutory authority.

7.2 Copper Tubes

Drawn copper tubes conforming to IS 2501 of outside diameter 10, 12 or 20 mm, as suitable, shall be used.

7.3 Stainless Steel Tubes

Cold drawn seamless, cold drawn electric resistance welded (ERW) or oxy-acetylene welded SS tubes of suitable size conforming to IS 3601 shall be used.

7.4 Mild Steel Tubes

Electric resistance welded (ERW) mild steel tubes of suitable size conforming to medium and heavy class of IS 1239 (Part 1) or hot finished seamless tubes shall be used.

7.5 Any material other than the ones mentioned in **7.2**, **7.3** and **7.4** shall be used with prior approval of statutory authority.

7.6 The piping shall withstand a pressure of 3.5 kg/cm^2 and shall not leak or burst.

7.7 The joints in the piping shall be either welded or brazed or flanged and shall be leak-proof. In case threaded connections are employed same shall be galvanized fittings.

7.8 The material used for welding or brazing of joints shall be fire resistant, of adequate mechanical strength and shall have a minimum melting point of 540°C.

7.9 The flanges used for flanged joints shall be machined, preferably with raised faces. Metallic gaskets or spiral wound metallic gasket of minimum thickness 1.5 mm shall be used.

7.10 The pipe shall not pass through or be concealed in cupboard or similar structure. Similarly, piping shall not run through an air or ventilation duct, chimney flue or lift shaft.

7.11 The piping passing through the walls shall be protected by a covering sleeve. The material used to pack the space between piping and sleeve shall be moisture proof so as not to corrode the piping.

7.12 Care should be taken that the piping is not damaged by expansion, contraction or vibration.

7.13 The plumbing work shall be carried out by qualified and trained personnel only.

8 FLEXIBLE CONNECTIONS

8.1 Hoses conforming to IS 9573 Type 4 only shall be used for LPG. To use any other hose prior approval of statutory authority shall be taken.

8.2 The length of a flexible hose should not be more than 1.5 m.

8.3 Multiple connections using flexible hoses shall not be used.

8.4 It is the responsibility of the installer to ensure that the hose used is not past replacement date.

9 LEAK TESTING

9.1 Before putting the water heater into service, the entire pipeline along with all the connections and joints shall be tested to ensure that it is gas tight. Where any part of the system is enclosed, the test shall precede the work of closing it.

9.2 Naked flames shall never be used for checking the gas tightness of installation. It is recommended that soap solution or similar materials may be employed to detect leakage.

9.3 Defective pipes and fittings shall be replaced and shall not be repaired *in-situ*.

10 INSTRUCTION TO THE CUSTOMERS

10.1 In case gas odour/leak is detected close the gas supply immediately ventilate the room by opening, door, windows, etc. Do not activate any electrical switches or operate the water heater, call emergency number (as applicable) or installer immediately to attend before using the water heater.

10.2 When water heater is not being used for a longer period of time it is desirable to close the gas supply.

10.3 The customer shall be instructed by the supplier and installer on following points:

a) Operation of the water heater.
b) How to recognize gas leakage.
c) Action to be taken in case of gas leakage.
d) Action to be taken in case of fire.
e) Action to be taken in case of damage to, or failure of, any part of installation.
f) Do’s and don’ts of the water heater.
g) Safety instructions provided by the water heater manufacturer.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Domestic and Commercial Gas Burning Appliances (Pressure Type)
Sectional Committee, MED 23

Organization	*Representative(s)*
LPG Equipment Research Centre, Bangalore	Shri R. B. Koganti (***Chairman***) Shri R. Rajakumar (*Alternate*)
All India LP Gas Stove Association, Delhi	Shri M. L. Anand Shri Sunil Talwar (*Alternate*)
Ashok Home Appliances Pvt Ltd, Rajkot	Shri V. H. Barchha Shri R. H. Barchha (*Alternate*)
Bharat Petroleum Corp Ltd, Mumbai	Shri J. Vedagiri Shri Sanjay Phulli (*Alternate*)
Bureau of Energy Efficiency, New Delhi	Shri Sandeep Garg
Centre of Technology for Sustainable Development (CTSD), Faridabad	Dr S. P. Srivastava Shri R. K. Paulastya (*Alternate*)
Chemo Electronic Laboratory, Distt Valsad	Dr R. C. Naik Shri Rajan A. Joshi (*Alternate*)
Delton Industries, Delhi	Shri R. C. Nangia Shri Vivek Nangia (*Alternate*)
DGQA, Delhi	Shri S. J. Kolarkar Lt Col N. Mukherjee (*Alternate*)
Gandhimathi Appliances Limited, Chennai	Shri V. M. Kumaresan Shri K. Sivasubramanian (*Alternate*)
Gorani Indusrtries Limited, Indore	Shri Anil Gorani Shri Sanjay Gorani (*Alternate*)
Goyal Engineers (P) Ltd, Delhi	Shri D. P. Goyal Shri Ajay Goyal (*Alternate*)
Hindustan Petroleum Corporation Ltd, Mumbai	Shri M. Selvakumar Shri Alok Kumar Gupta (*Alternate*)
Ideal Engineers Hyderabad Ltd, Hyderabad	Shri Satish Kabra Shri Deepak Kabra (*Alternate*)
Indian Institute of Petroleum, Dehradun	Shri U. K. Jaiswal Shri V. K. Verma (*Alternate*)
Indian Oil Corporation (R&D), Faridabad	Shri S. P. Dubey Shri R. Mahapatra (*Alternate*)
Indian Oil Corporation, Mumbai	Shri Rabindra N. Ghosh Shri Sunil Rambhal (*Alternate*)
Indraprastha Gas Limited, New Delhi	Shri Bhudev Singh Shri K. C. Dewangan (*Alternate*)
Loss Prevention Association of India Ltd, Mumbai	Shri Abhijit Das Shri D. K. Sarkar (*Alternate*)
Mahanagar Gas Limited, Mumbai	Shri Rajesh Shripad Shri Sushil Patil (*Alternate*)
Petroleum Conservation Research Association, New Delhi	Shri A. K. Goel Shri Ajit Kumar (*Alternate*)
Racold Thermo Limited, Pune	Shri Jagdish Mulimani
Rama Domestic Appliances, Delhi	Shri Amarjeet S. Kohli Shri Manmohan Krishnan (*Alternate*)
Shri Shakti Alternative Energy Ltd, Hyderabad	Shri D. V. Satyakumar Shri Siddhartha Sengupt (*Alternate*)
Sunflame Industries, Faridabad	Shri K. L. Verma Shri A. K. Dhingra (*Alternate*)

Organization	*Representative(s)*
Superflame Appliances Private Limited, Faridabad	Shri Vikram Verma
United Works Pvt Ltd, Mumbai	Shri Victor Macmull Shri S. Bhorgharkar (*Alternate*)
Vanaz Engineers Ltd, Pune	Shri S. R. Sarvate Shri S. J. Vispute (*Alternate*)
In Personal Capacity (*S*-139*, Greater Kailash-I, New Delhi*-110048)	Shri M. K. Gupta
BIS Directorate General	Shri J. A. Siddiqui, Scientist ‘F’ and Head (MED) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri Vishal Tomer
Scientist ‘C’ (MED), BIS

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